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As modified by amendments annexed to the International Preliminary Examination
Report

- 1 -

Knitting machine

Technical field

5 The invention relates to a knitting machine according to the preamble of claim 1.

Prior art

10 There are many known knitting machines of the type initially mentioned. Such knitting
machines are equipped with an electronic control device for controlling the knitting
machine on the basis of a pattern program for the textile material to be produced. The
pattern program may be produced in the control device itself or in an external electronic
pattern apparatus from which it can then be supplied to the electronic control device in
the knitting machine by means of a data carrier or data line. The knitting machine
15 contains, furthermore, electrically driven thread feeders for supplying weft threads to the
weft bars which, according to the pattern program, lay the weft threads across the knitting
needles which tie up the weft threads. The knitting machines are equipped, furthermore,
with a take-down device for the textile material produced. The disadvantage, however, is
that the thread feeders can operate only at an adjustable constant speed which is not
20 sufficient in many instances, since, particularly in the case of changing patterning,
changing delivery quantities for the weft thread or weft threads are also required, and the
weft bars have themselves to draw addition thread lengths which are lacking. This leads
to faults in the textile material and/or also in the knitting machine during the processing
of thread qualities which, in particular, have different thicknesses.

25 US-A-4, 487, 039 discloses a warp knitting machine in which weft threads are supplied to
two transport devices arranged at a distance from one another. For this purpose, there is a
carriage which is movable to and fro between the transport devices and to which the weft
threads are supplied by means of a driven delivery mechanism. The drive of the delivery
30 mechanism to be changed continuously, taking into account the instantaneous carriage

speed and carriage position, in order to adapt the tension of the weft threads to the changing speeds and positions of the carriage and to keep said tension as constant as possible. The drive is controlled via a pulse generator which is dependant on the rotation of the main shaft. An individual control of the length of the weft thread to be supplied in
5 each case, on the one hand, and of the required length on the basis of the pattern program, on the other hand, cannot be gathered from this publication.

Presentation of the invention

10 The purpose of the invention is to improve further a knitting machine of the type initially mentioned.

The said object is achieved by means of the characterizing features of claim 1. Since the control device has control means in order to set the delivery length of the weft thread to
15 be supplied according to the travel of the weft bar, said travel being predetermined from the pattern program, this ensures that the exactly required thread length is always available for each laying of a weft thread and for each pattern. There is no longer any need for the weft thread to be drawn off by the weft bar, for example from a cone. As a result, the textile material, in general, and the pattern formation, in particular, are
20 appreciably improved. During the knitting operation, faults, such as thread breaks and flaws, are largely prevented.

A development as claimed in claim 2 is particularly advantageous, since, by means of the correcting factor which additionally varies the delivery length of the weft thread, further
25 adaption, for example, to different thread qualities and/or pattern properties of the textile material to be produced can be achieved.

A particularly advantageous correcting apparatus has, as claimed in claim 3, a screen, preferably a touch screen, and an editing element for manual selection of various
30 indicators and control layers, in particular that for handling the correcting factor.

Brief description of the drawings

Exemplary embodiments of the invention are described in more detail below with

5 reference to the drawings in which:

figure 1 shows diagrammatically a side view of the set-up of a knitting machine;
and

10 figure 2 shows an indicator and switching layer for setting a correcting factor for thread feeders.

Ways of implementing the invention

15 Figure 1 shows a diagram of a knitting machine in a side view. At a knitting station 2, warped threads 4 are introduced in the usual way into knitting needles, not illustrated in any more detail, by means of thread laying devices 6. In addition, by means of thread guides arranged on weft bars 8, weft threads 10 are laid across one or more knitting needles according to the pattern program and are knitted in by means of these. The
20 warped threads 4 are taken down from a warp reel 12. The weft threads 10 are taken down, in each case by means of an electrically driven thread feeder 14, from a reel 16 and via a thread brake 18 and are supplied to the thread guides. Thread tensioners 20 ensure a uniform tension of the thread to be supplied. In the example shown, four weft threads are supplied to the knitting station 2. A further thread feeder 22 serves for supplying a
25 rubber thread 24 to the knitting station 2.

The textile material produced at the knitting station 2 is taken down, for example, from a take-down device 28 provided with an electric drive, runs through a thermosetting device 30 and arrives at an electrically driven additional take-down device
30 32 which discharges the finished textile material, for example, to a container 34.

The knitting machine contains an electronic control device 36 which, in the example shown, receives the pattern program for the textile material to be produced from an electronic pattern apparatus 40 via a floppy disk 38. The pattern program of the floppy disk 38 is entered into a reader 42 which is connected to the electronic control device 36. The control device 36 contains control means in order to set the delivery length of at least one weft thread 10 to be supplied according to the travel of the weft bar, said travel being predetermined from the pattern program. Furthermore, the control device 36 has a manually actuatable correcting apparatus 44 for the individual superposition of an adjusting correcting factor K onto the delivery data of at least one weft thread for at least one weft insertion. The correcting apparatus 44 is described in more detail with reference to figure 2.

The correcting apparatus 44 contains a screen 45 which is preferably designed as a touch screen and which has a series of indicator and switching elements for manually selectable indicator and switching layers.

Figure 2 shows the indicator and switching layer for the correcting factor K. The indicator and switching layer contains, first, an indicator element 46 showing the selected thread feeder which can be selected by means of the setting elements 48₁, 48₂. In the present example, the thread feeder 1 is selected. The indicator element 50 indicates the weft bar, here the weft bar 4, to which the set thread feeder applies, and in this case a corresponding selection can be made by means of the setting elements 52₁, 52₂.

However, it is necessary to coordinate which thread feeder has actually been assigned to which weft bar. The indicator element 54 designates the weft selected by means of the setting elements 56₁, 56₂, here weft number 1, to which the correcting factor K, which is evident on the indicator element 58 and here amounts to 102%, is to apply. The correcting factor K = 102% states that the already individual normal delivery length which is predetermined by control means on the basis of the pattern program and which amounts to 100% is to be increased by 2%. The correcting factor K may be increased or

reduced by means of the setting elements 60₁, 60₂. The indicator and setting layer can be changed by means of the key X.

List of reference symbols

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	K	Correcting factor
	X	Key
	2	Knitting station
10	4	Warp thread
	6	Thread laying device
	8	Weft bar
	10	Weft thread
	12	Warp reel
15	14	Thread feed
	16	Reel
	18	Thread brake
	20	Thread tensioner
	22	Thread feeder
20	24	Rubber thread
	26	Textile material
	28	Take-down device
	30	Thermosetting device
	32	Additional take-down device
25	34	Container
	36	Control device
	38	Floppy disk
	40	Pattern apparatus
	42	Reader
30	44	Correcting apparatus

	45	Screen
	46	Indicator element – thread feeder
	48 ₁	Setting element
	48 ₂	Setting element
5	50	Indicator element – weft bar
	52 ₁	Setting element
	52 ₂	Setting element
	54	Indicator – weft insertion
	56 ₁	Setting element
10	56 ₂	Setting element
	58	Indicator element – correcting factor
	60 ₁	Setting element
	60 ₂	Setting element

Pattern Claims

1. A knitting machine, with knitting needles and with at least one weft bar
(8) for laying at least one weft thread (10) across at least one knitting
5 needle, further with an electrically driven thread feeder (14, 22) for the
weft thread, and also with a take-down device (28) for the textile material
(26) and with an electronic control device (36) for controlling the knitting
machine on the basis of a pattern program for the textile material (26) to be
10 produced, characterized in that the control device (36) has control means
in order to set the delivery length of the weft thread (10, 24) to be supplied
according to the travel of the weft bar (8), said travel being predetermined
from the pattern program.
2. The knitting machine as claimed in claim 1, characterized in that the
15 control device (36) has a manually actuable correcting apparatus (44) for
the individual superposition of an adjustable correcting factor (K) onto the
delivery data of at least one weft thread (10, 24) for at least one weft
insertion.
3. The knitting machine as claimed in claim 2, characterized in that the
20 correcting apparatus (44) has a screen (45), preferably a touch screen, and
an indicator and control layer for the manual setting of the correcting
factor (K).